APPENDIX K

DEAD CREEK CADMIUM SOIL LEACHING INVESTIGATION INFORMATION

DEAD CREEK
SOIL-GROUNDWATER LEACHING INVESTIGATION

SAUGET AREA 1
SAUGET AND CAHOKIA, ILLINOIS

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December 2007

043-9670

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1.0 INTRODUCTION

This report summarizes the Dead Creek Soil to Groundwater Leaching Investigation activities performed at the Sauget Area 1 site in Sauget, Illinois during July 2007. The work was performed in accordance with the Sauget Area 1 – Revised Sampling Plan for Dead Creek Soil-Groundwater Leaching Investigation Work Plan dated April 27, 2007. This plan was approved by the U.S. Environmental Protection Agency (USEPA) on May 24, 2007. Any deviations from the Work Plan are identified and discussed in the report.

Groundwater samples were collected on July 10 and 11, 2007 from four temporary wells installed in each of Creek Segments C, D, E, and F. The temporary wells were located downgradient of the location of the transect in each creek segment where the highest concentration of cadmium was detected during sampling performed in 2002 immediately following removal of the creek bottom sediments (Figures 1 and 2). The temporary wells were installed on July 9, 2007 and were subsequently removed following sampling. This report summarizes the work performed during the investigation.

2.0 GROUNDWATER SAMPLING ACTIVITIES

2.1 Soil Borings

Roberts Environmental Drilling Inc. (REDI) advanced four boreholes and installed temporary wells at four locations west of Dead Creek on July 9, 2007, under the direct supervision of Golder Associates Inc. (Golder). The field work was also observed on a full time basis by a representative of CH2M Hill, the USEPA oversight contractor.

The boreholes were advanced at the following locations:

- Transect-T7 at Dead Creek Segment C (CSC-T7), temporary well 7
- Transect-T2 at Dead Creek Segment D (CSD-T2), temporary well 2
- Transect-T16 at Dead Creek Segment E (CSE-T16), temporary well 16
- Transect-T6 at Dead Creek Segment F (CSF-T6), temporary well 6

The four soil borings were advanced using direct-push technology (DPT) with a Geoprobe® 6610 series track-mounted rig. Samples were collected for lithologic logging as the boreholes were advanced with 2-inch macrocore sample barrels. The boreholes were advanced until groundwater was encountered as indicated in the soil samples and were terminated approximately five feet below the water table.

Soil samples were continuously collected in 4-foot intervals and classified by Golder personnel according to the Unified Soil Classification System (USCS). All soil from each borehole was collected in 5-gallon plastic buckets and was transferred to a labeled 55-gallon drum located at the Judith Lane facility.

2.2 Temporary Well Installation

A temporary well was installed at each boring location. Installation consisted of placing a five-foot long, ¾-inch diameter, flush-threaded 0.010-inch slotted schedule 40 PVC pre-packed well screen through the Geoprobe® rods. The screen was pushed to a depth of at least five feet below the groundwater table and the rods were slowly withdrawn from the borehole to expose the screen to the groundwater. In order to reduce the turbidity of the samples, silica sand was poured to a depth approximately two feet above the top of the well screen to create a filter pack and bentonite pellets were then placed to the ground surface. A riser pipe constructed of ¾-inch diameter schedule 40 PVC extended the temporary wells above ground surface.

Temporary well T6 was offset approximately 150 feet west of CSF-T6 due to inaccessibility issues caused by dense woods and underbrush. Temporary well T16 was offset approximately 50 feet west of CSE-T16 because an apartment complex is located on the edge of Dead Creek and there is no room for drilling equipment between the structure and the creek at the location of Transect T16. The CH2M Hill representative was present when these locations were selected and accepted the need to offset them from the creek bank. The other two temporary wells were located on the crest of the bank, approximately one to five feet from the edge of the bank. The locations of the temporary wells are shown on Figures 1 and 2.

2.3 Groundwater Sampling

Golder conducted groundwater sampling at the four temporary wells on July 10 and 11, 2007. A total of twelve (12) groundwater samples were collected immediately below the water table through dedicated polyethylene tubing using a low flow, peristaltic pump. The wells were purged and water quality parameters (pH, temperature, specific conductivity, and turbidity) were measured and recorded during purging. Purging continued until all the parameters had stabilized for three consecutive readings and the turbidity was approximately 10 NTUs or lower.

Both filtered and unfiltered samples were collected for cadmium analyses. Two filtered samples were collected at each sampling location. One sample was passed through a 10 micron filter, while the other was passed through a 0.45 micron filter. This allowed the measurement of total cadmium concentrations (unfiltered samples), as well as the colloidal (10-micron filtered samples) and dissolved (0.45-micron filtered samples) concentrations. All the filtration was done using in-line filters to avoid exposure of the samples to air. Groundwater samples were preserved on ice and sent to Test America in Savannah, Georgia for analysis (formerly Savannah Laboratories).

All samples were collected and analyzed using the methods, procedures and protocols included in the Sauget Area 1 EE/CA and RI/FS Support Sampling Plan, Field Sampling Plan and Quality Assurance Project Plan approved by the USEPA on September 9, 1999. The groundwater samples were analyzed for cadmium using USEPA SW-846 Method 3550/6020.

Purge water collected during sampling from each borehole was stored in 5-gallon plastic buckets and transferred to a labeled 55-gallon drum located at the Judith Lane facility.

2.4 Temporary Well Abandonment

Following sampling of the four temporary wells, removal of the riser pipe and screen, as required by the approved Work Plan, proved unsuccessful in three of the four installations due to the settling of the bentonite pellets and sand around the screen and riser pipe. The uppermost section of the riser pipe from T6, T2 and T16 was removed and the remainder of the hole was filled with hydrated bentonite pellets. The pre-packed screen in temporary well T7 was removed and the borehole was filled with bentonite pellets. Final abandonment of T16 consisted of an asphalt patch to match the existing asphalt in the parking lot. All personal protective equipment and expendable well materials that were accumulated throughout the investigation activities were transferred to a labeled 55-gallon drum at the Judith Lane facility.

3.0 GROUNDWATER SAMPLING RESULTS

3.1 Data Validation Results

As mentioned, twelve (12) samples were collected using a low flow, peristaltic pump. Two field duplicates were also collected, as was a matrix spike/matrix spike duplicate (MS/MSD) which was collected with sample MW-T16-UNF. Samples were analyzed for cadmium, using the methods, procedure, and protocols included in the Sauget Area 1 EE/CA and RI/FS Support Sampling Plan, Field Sampling Plan and Quality Assurance Project Plan approved by USEPA on September 9, 1999.

Data validation was performed following the general guidelines of Section 9.2 of the "Quality Assurance Project Plan, Sauget Area 1 Support Sampling Project, Sauget and Cahokia, Illinois, Volume 2". A summary of the validated analytical results is included in Table 1, and laboratory analytical reports are attached as Appendix B. Data validation reports are attached as Appendix C.

There was one minor concern about some of the samples that required qualification of the results because the serial dilution was not within a 10% difference (%D) of the original determination after correction for dilution. Requirements for acceptable instrument calibration are established to ensure the instrument is capable of generating satisfactory data. The USEPA functional guidelines for data evaluation require that if the analyte concentration is sufficiently high (50 times the Method Detection Limit (MDL)), the serial dilution analysis should be within 10% of the original determination after correction for dilution. In accordance with the functional guidelines, results that were greater than, or equal to the MDL, were qualified as estimated values (J) and non-detects were also qualified as estimated values (UJ). Samples MW-T2-UNF, MW-T2-10, MW-T2-0.45 were qualified with J flags, while samples MW-T6-10 and MW-T6-0.45 were qualified with UJ flags, based on a review of serial dilution. No data were rejected.

Where a positive result was qualified as estimated, the analyte should be considered present. Similarly, a detected or non-detected result, which was qualified as an estimated reporting limit, should be considered not present for the purposes of this program, although the limit itself may not be precise. The completeness for the entire data set was 100%.

3.2 Discussion of Results

Groundwater sample results for each temporary well are presented below for the filtered and unfiltered fractions along with the temporary well location and the cadmium concentrations in soil samples obtained in 2002 (2002 soil samples collected from soil remaining in Dead Creek following the removal action):

Creek Segment and Sample ID	Location	2002 Concentration (mg/kg)	Unfiltered Conc. (mg/L)	Filtered Conc. (10 µm) (mg/L)	Filtered Conc. (0.45µm) (mg/L)
C-MW-T7	**Approx. one foot from bank at T-7**	**25 J**	**0.00024 J**	**0.00016 J**	**0.00017 J**
D-MW-T2	**Approx. one foot from bank at T-2**	**40 J**	**0.00056 J**	**0.00051 J**	**0.00058 J**
E-MW-T16	**50 ft. west of bank at T-16**	**38 J**	**0.00013 J**	**0.00014 J**	0.00050 U
F-MW-T6	**150 ft. west of bank at T-6**	**70**	**0.00015 J**	0.00050 UJ	0.00050 UJ

J - Denotes an estimated concentration
U - Compound not detected
Bold text denotes compound detected at a concentration in excess of the detection limit

Examination of the results in the preceding table shows that there is no significant difference between filtered and unfiltered cadmium concentrations in any of the samples. In each of the samples, the detections in each fraction (unfiltered, colloidal, and dissolved) were within 0.0001 mg/L of other samples from the same well. Results for each individual monitoring well are discussed below:

- In MW-T7 (Creek Segment C), cadmium was detected in all three samples. Cadmium concentrations in the unfiltered sample were greatest (0.00024 mg/L) and were similar in the filtered samples (0.00016 and 0.00017 mg/L, respectively). The very small differences in the concentrations in the three sample fractions make meaningful comparisons difficult.

- In MW-T2 (Creek Segment D), cadmium concentrations were also similar in all three samples. Based on these results, it appears that the cadmium in these samples was primarily dissolved in groundwater.

- In MW-T16 (Creek Segment E), cadmium concentrations were similar in the unfiltered and colloidal fractions, but was not detected in the dissolved phase. These results demonstrate that cadmium is primarily associated with colloidal sized material at this location.

- In MW-T6 (Creek Segment F), cadmium was only detected in the unfiltered sample, indicating that it was associated with particulate matter suspended in the sample and is not mobile in the groundwater.

The other point to be noted about the results summarized in the table is that the cadmium concentrations in samples from all of the wells are very similar, with the sample concentrations in well MW-T2 being marginally higher than the others. Given these similarities, it is reasonable to expect that the results obtained from the wells in Creek Sectors E and F are representative of conditions immediately downgradient of the creek, despite the fact that these wells were not immediately adjacent to the creek.

Transects with the highest cadmium concentrations in soil were selected in each creek segment for the leaching to groundwater investigation. Since all groundwater results (both filtered and unfiltered) were below the Illinois Class I groundwater protection standard of 0.005 mg/L, the results of this investigation demonstrate that cadmium leaching from soils in the creek bottom does not present an issue for shallow groundwater quality. The cadmium concentrations detected in all groundwater samples (both filtered and unfiltered fractions) were all less than 0.001 mg/L and three of the four temporary wells contained cadmium at concentrations that are less than five percent of the Illinois Class I groundwater protection standard of 0.005 mg/L. As explained in the USEPA-approved Sampling Plan for the Investigation, in creek Sectors C through F, constituents other than cadmium were demonstrated to not be of concern for leaching to groundwater based on concentrations remaining in creek bottom soils. This investigation has demonstrated that, in addition, cadmium is not of concern for leaching to groundwater.

4.0 SIGNATURES

Please contact us if you have any questions regarding this work or require additional information.

Sincerely,

GOLDER ASSOCIATES INC.

-signature in original hard copy-

Amanda W. Gilbertson, Ph.D.
Staff Environmental Engineer

-signature in original hard copy-

Mike S. Lemon, P.E., R.G.
Project Engineer

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Frederick M. Booth, P.G.
Senior Consultant, Principal

TABLES

Table 1

Summary of Validated Groundwater Sample Detections - Inorganics (July 2007 Sampling Event)
Dead Creek Soil-Groundwater Leaching Investigation
Sauget Area 1
Solutia, Inc. - Sauget, Illinois

Monitoring Well		MW-T2-UNF	MDL	MW-T2-10	MDL	MW-T2-0.45	MDL	MW-T6-UNF	MDL	MW-T6-10	MDL	MW-T6-0.45	MDL
Lab Sample ID		680-28339-7		680-28339-8		680-28339-9		680-28339-11		680-28339-12		680-28339-13	
Date Sampled		7/11/2007		7/11/2007		7/11/2007		7/11/2007		7/11/2007		7/11/2007	
Time Sampled		11:25		11:30		11:35		15:10		15:15		15:20	
Metals (USEPA Method 6020)													
Date Prepared		7/19/2007		7/19/2007		7/19/2007		7/19/2007		7/19/2007		7/19/2007	
Date Analyzed		7/21/2007		7/21/2007		7/21/2007		7/21/2007		7/21/2007		7/21/2007	
Analyte	**CAS No.**	**(mg/L)**		**(mg/L)**		**(mg/L)**		**(mg/L)**		**(mg/L)**		**(mg/L)**	
Cadmium	7440-43-9	***0.00056 J***	0.00012	***0.00051 J***	0.00012	***0.00058 J***	0.00012	***0.00015 J***	0.00012	0.00050 UJ	0.00012	0.00050 UJ	0.00012

Parameters not listed were not detected in any samples.
Results in ***bold italics*** denote detections.
mg/L - milligrams per Liter
MDL - Method Detection Limit

Flags and Qualifiers
U - Analyte was not detected at or
above the Method Detection Limit (MDL).
J - Result is an estimated value.
The concentration is an approximate value.

Checked by: JAP Date: 8/30/07
Reviewed by: AWG Date: 8/31/07

Table 1
Summary of Validated Groundwater Sample Detections - Inorganics (July 2007 Sampling Event)
Dead Creek Soil-Groundwater Leaching Investigation
Sauget Area 1
Solutia, Inc. - Sauget, Illinois

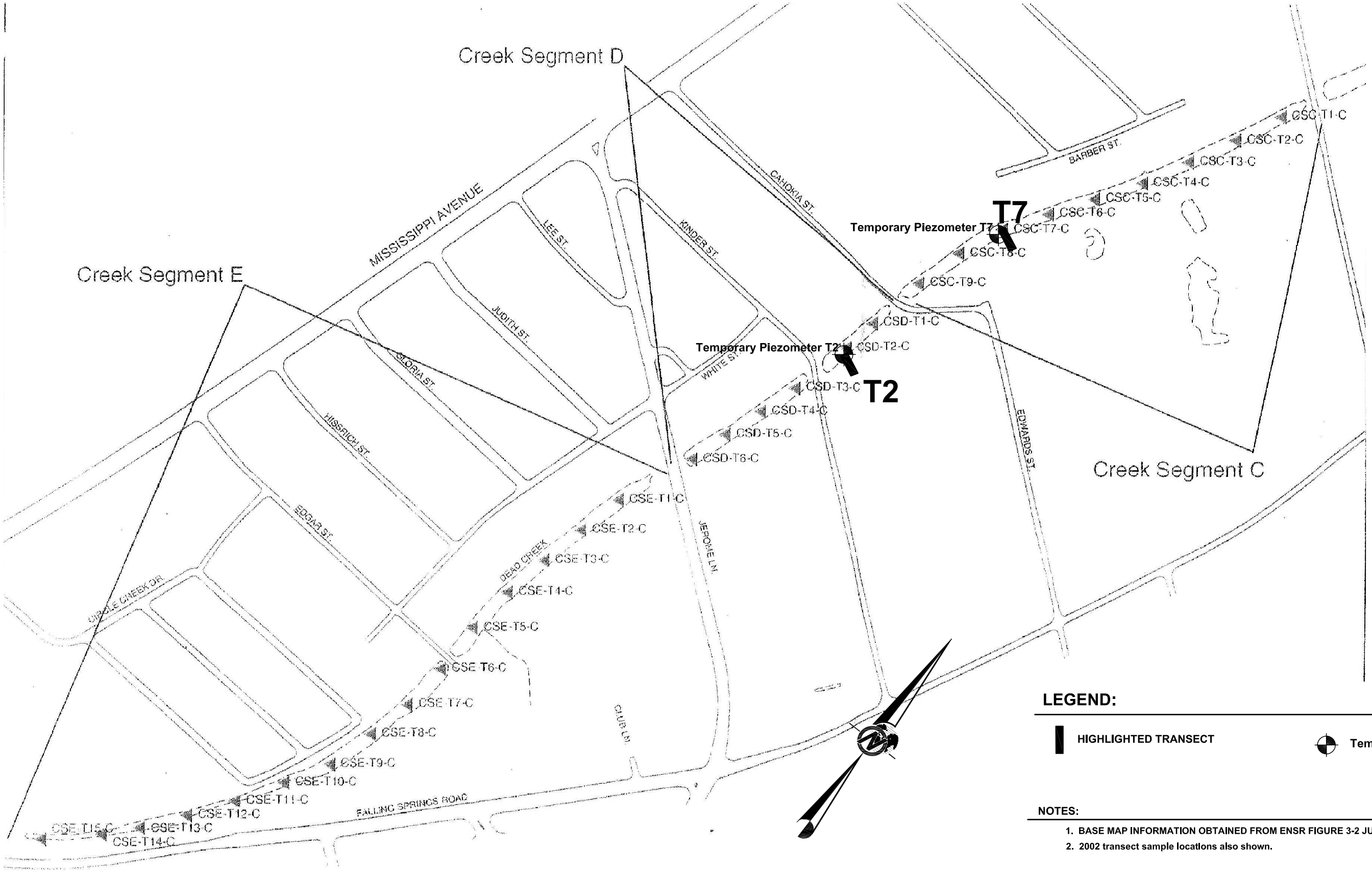
Monitoring Well		MW-T7-UNF	MDL	MW-T7-10	MDL	MW-T7-0.45	MDL	MW-T16-UNF	MDL	MW-T16-10	MDL	MW-T16-0.45	MDL
Lab Sample ID		680-28339-1		680-28339-2		680-28339-3		680-28339-4		680-28339-5		680-28339-6	
Date Sampled		7/10/2007		7/10/2007		7/10/2007		7/11/2007		7/11/2007		7/11/2007	
Time Sampled		12:50		12:55		13:00		9:20		9:25		9:30	
Metals (USEPA Method 6020)													
Date Prepared		7/19/2007		7/19/2007		7/19/2007		7/19/2007		7/19/2007		7/19/2007	
Date Analyzed		7/21/2007		7/21/2007		7/21/2007		7/21/2007		7/21/2007		7/21/2007	
Analyte	**CAS No.**	**(mg/L)**		**(mg/L)**		**(mg/L)**		**(mg/L)**		**(mg/L)**		**(mg/L)**	
Cadmium	7440-43-9	***0.00024 J***	0.00012	***0.00016 J***	0.00012	***0.00017 J***	0.00012	***0.00013 J***	0.00012	***0.00014 J***	0.00012	0.00050 U	0.00012

Parameters not listed were not detected in any samples.
Results in ***bold italics*** denote detections.
mg/L - milligrams per Liter
MDL - Method Detection Limit

Flags and Qualifiers
U - Analyte was not detected at or
above the Method Detection Limit (MDL).
J - Result is an estimated value.
The concentration is an approximate value.

Checked by: JAP Date: 8/30/07
Reviewed by: AWG Date: 8/31/07

FIGURES



LEGEND:

- HIGHLIGHTED TRANSECT
- Temporary Piezometer

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM ENSR FIGURE 3-2 JUNE 21, 2002.
2. 2002 transect sample locations also shown.

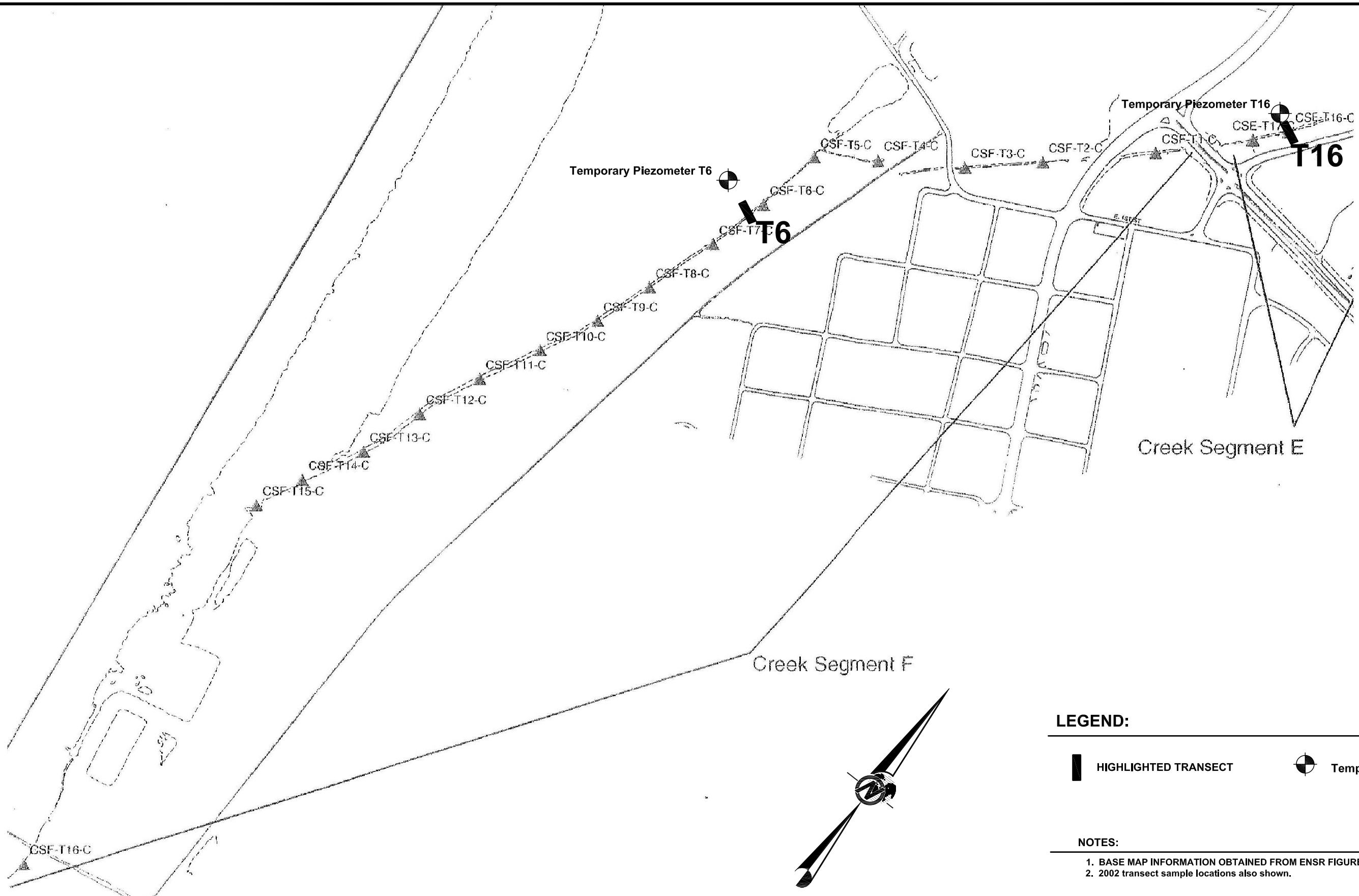
Golder Associates
St. Louis, Missouri

FILE No.	0439670.0005a
PROJECT No.	043–9670
REV.	0
SCALE	AS SHOWN
DATE	08/29/07
DESIGN	JAP
CADD	MNH
CHECK	AG
REVIEW	FMB

TITLE: **CS-C AND CS-D SAMPLE LOCATIONS**

PROJECT: SAUGET AREA 1
Sauget, Illinois

FIGURE: 1



LEGEND:

- HIGHLIGHTED TRANSECT
- Temporary Piezometer

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM ENSR FIGURE 3-3 JUNE 21, 2002.
2. 2002 transect sample locations also shown.

Golder Associates
St. Louis, Missouri

FILE No.	0439670.0005b
PROJECT No.	043–9670
REV.	0
SCALE	AS SHOWN
DATE	08/29/07
DESIGN	MSL
CADD	MNH
CHECK	AG
REVIEW	FMB

TITLE
CS-E AND CS-F SAMPLE LOCATIONS

PROJECT
SAUGET AREA 1
Sauget, Illinois

FIGURE
2

APPENDICES

APPENDIX A

TEMPORARY WELL BORING LOGS, FIELD PURGING RECORDS & FIELD NOTES

LOG OF GEOPROBE BOREHOLE

BOREHOLE T 2

Golder Associates

INVESTIGATION AREA	Creek Segment D, Transect T2, West of Dead Creek	**DRILLER**	Joe Cox		**START** / **FINISH**
		RIG	6610 Delta T	**DATE**	7/9/07 / 7/9/07
		NO. SAMPLES	4	**TIME**	10:45 / 11:25
TOTAL DEPTH	16.0 feet Below Ground Surface (BGS)	**LOCATION**	Dead Creek, Cahokia, Illinois	**BACKFILL TYPE**	Bentonite Pellets
BOREHOLE DIAM.	2.5 inches				

DEPTH (Feet)	SAMPLE No.	PID (ppm)	RECOVERY	OTHER	DESCRIPTION AND COMMENTS
	1	0.0	2.9/4.0		0.0-2.0 Firm, dark yellowish brown (10YR 4/2), SILT, trace organics, damp, (ML)
					2.0-5.8 Compact, moderate yellowish brown (10YR 5/4), fine grained SILTY SAND, dry to damp, (SW)
4					
	2	0.0	3.3/4.0		5.8-7.0 Firm, moderate yellowish brown (10YR 5/4) with dark gray (N3) mottling, CLAYEY SILT, damp, (MH)
					7.0-7.6 Loose, moderate yellowish brown (10YR 5/4), fine grained SAND, damp, (SP)
8					
	3	0.0	3.0/4.0	▼ 10.13 7/9/07 11:25	7.6-9.0 Soft, dark yellowish brown (10YR 4/2), fine grained SANDY SILT, moist, (SM)
					9.0-9.2 Loose, moderate yellowish brown (10YR 5/4), fine grained SAND, damp, (SP)
12					9.2-10.2 Firm, moderate yellowish brown (10YR 5/4) with dark gray (N3) mottling, CLAYEY SILT, damp, (MH)
	4	0.0	3.2/4.0		10.2-13.8 Compact, dark yellowish brown (10YR 4/2), very fine grained SILTY SAND, wet, (SW)
					13.8-14.0 Compact, dark yellowish brown (10YR 4/2), very fine grained SAND, wet, (SW)
16					14.0-16.0 Compact, brownish gray (5YR 4/1), fine grained SAND, wet, (SP)
					END OF BOREHOLE @ 16.0 FEET BGS

PROJECT No	043-9670	**LOGGED BY**	MSL
PROJECT	Dead Creek Soil to Groundwater Leaching Investigation	**CHECKED BY**	MSL
LOCATION	Cahokia, Illinois	**REVIEWED BY**	8/3/2007

LOG OF GEOPROBE BOREHOLE

BOREHOLE T 6

Golder Associates

INVESTIGATION AREA	Creek Segment F, Transect T6, West of Dead Creek	**DRILLER**	Joe Cox		**START** / **FINISH**
		RIG	6610 Delta T	**DATE**	7/9/07 / 7/9/07
		NO. SAMPLES	4	**TIME**	09:12 / 10:30
TOTAL DEPTH	14.0 feet Below Ground Surface (BGS)	**LOCATION**	Dead Creek, Cahokia, Illinois	**BACKFILL TYPE**	Bentonite Pellets
BOREHOLE DIAM.	2.5 inches				

DEPTH (Feet)	SAMPLE No.	PID (ppm)	RECOVERY	OTHER	DESCRIPTION AND COMMENTS
					0.0-1.6 Soft, moderate yellowish brown (10YR 5/4), CLAYEY SILT, damp, (MH)
	1	0.0	3.5/4.0		1.6-2.5 Firm, moderate yellowish brown (10YR 5/4), SILTY CLAY, damp, (CL)
4					2.5-2.9 Loose, light brown (5YR 6/4), fine grained SAND, damp, (SP)
	2	0.0	3.1/4.0		2.9-5.9 Soft, moderate yellowish brown (10YR 5/4), SILT, trace fine grained sand, some clay, damp, (ML)
8					5.9-9.8 Loose, moderate yellowish brown (10YR 5/4), fine grained SAND, wet, (SP)
				▼ 9.80 7/9/07 10:35	
	3	0.0	3.6/4.0		9.8-10.7 Soft, light gray (N7), CLAY, damp, (CH)
12					10.7-14.0 Loose, moderate yellowish brown (10YR 5/4), SAND, wet, (SP)
	4	0.0	2.0/2.0		
14					

END OF BOREHOLE @ 14.0 FEET BGS

PROJECT No	043-9670	**LOGGED BY**	MSL
PROJECT	Dead Creek Soil to Groundwater Leaching Investigation	**CHECKED BY**	MSL
LOCATION	Cahokia, Illinois	**REVIEWED BY**	8/3/2007

LOG OF GEOPROBE BOREHOLE

BOREHOLE T 7

Golder Associates

INVESTIGATION AREA	Creek Segment C, Transect T7, West of Dead Creek	**DRILLER**	Joe Cox		**START** / **FINISH**
		RIG	6610 Delta T	**DATE**	7/9/07 / 7/9/07
		NO. SAMPLES	4	**TIME**	14:45 / 15:40
TOTAL DEPTH	16.0 feet Below Ground Surface (BGS)	**LOCATION**	Dead Creek, Cahokia, Illinois	**BACKFILL TYPE**	Bentonite Pellets
BOREHOLE DIAM.	2.5 inches				

DEPTH (Feet)	SAMPLE No.	PID (ppm)	RECOVERY	OTHER	DESCRIPTION AND COMMENTS
					0.0-1.8 Firm, dark yellowish brown (10YR 4/2), SILTY CLAY, trace organics, (CL)
	1	0.0	3.1/4.0		1.8-10.4 Soft, moderate yellowish brown (10YR 5/4) with dark yellowish brown (10YR 4/2) mottling, SANDY SILT, damp, (ML)
4					
	2	0.0	3.0/4.0		@5.5 Wet
8				▼ 7.60 7/9/07 15:40	
	3	0.0	4.0/4.0		10.4-11.0 Stiff, light gray (N7), SILTY CLAY, damp, (CL)
12					11.0-13.6 Soft, moderate yellowish brown (10YR 5/4), CLAYEY SILT, trace fine sand, wet, (MH)
	4	0.0	4.0/4.0		13.6-15.6 Loose, light gray (N7), fine grained SILTY SAND, trace clay, wet, (SM)
16					15.6-16.0 Compact, pale yellowish brown (10YR 6/2), fine grained SAND, damp to moist, (SP)
					END OF BOREHOLE @ 16.0 FEET BGS

PROJECT No	043-9670	**LOGGED BY**	MSL
PROJECT	Dead Creek Soil to Groundwater Leaching Investigation	**CHECKED BY**	MSL
LOCATION	Cahokia, Illinois	**REVIEWED BY**	8/3/2007

LOG OF GEOPROBE BOREHOLE

BOREHOLE T 16

Golder Associates

INVESTIGATION AREA	Creek Segment E, Transect T16, West of Dead Creek	**DRILLER**	Joe Cox		**START** / **FINISH**
		RIG	6610 Delta T	**DATE**	7/9/07 / 7/9/07
		NO. SAMPLES	4	**TIME**	13:05 / 13:55
TOTAL DEPTH	15.0 feet Below Ground Surface (BGS)	**LOCATION**	Dead Creek, Cahokia, Illinois	**BACKFILL TYPE**	Bentonite Pellets
BOREHOLE DIAM.	2.5 inches				

DEPTH (Feet)	SAMPLE No.	PID (ppm)	RECOVERY	OTHER	DESCRIPTION AND COMMENTS
					0.0-0.3 ASPHALT
	1	0.0	2.9/4.0		0.3-1.6 Compact, light brown (5YR 6/4) and black (N1), fine grained GRAVEL and CINDERS, (fill)
4					1.6-5.6 Firm, moderate yellowish brown (10YR 5/4) with dark yellowish brown (10YR 4/2) mottling, SILTY CLAY, damp, (CL)
	2	0.0	2.8/4.0		5.6-6.5 Soft, moderate yellowish brown (10YR 5/4), CLAYEY SILT, moist, (MH)
8					6.5-10.8 Firm, moderate yellowish brown (10YR 5/4) with dark yellowish brown (10YR 4/2) mottling, CLAYEY SILT, damp, (MH)
	3	0.0	2.1/4.0	▼ 8.60 7/9/07 13:35	
12					10.8-11.3 Firm, light gray (N7) with black (N1) laminations, SANDY SILT, fine grained, some clay, moist to wet, (ML)
	4	0.0	1.2/3.0		11.3-15.0 Soft, moderate yellowish brown (10YR 5/4) with dark yellowish brown (10YR 4/2) mottling, SILTY SAND, fine grained, wet, (SM)
15					

END OF BOREHOLE @ 15.0 FEET BGS

PROJECT No	043-9670	**LOGGED BY**	MSL
PROJECT	Dead Creek Soil to Groundwater Leaching Investigation	**CHECKED BY**	MSL
LOCATION	Cahokia, Illinois	**REVIEWED BY**	8/3/2007

Golder Associates

SUBJECT	Monsanto Dead Creek	
Job No. / Ref.	Made by / Checked / Reviewed	Date / Sheet 1 of

7/9/07

0800 Arrive on site
0815 Roberts on site
Chevrmill on site
Hold Safety briefing
0840 Mob to T6

12:00 Lunch
13:00 Start clearing brush tracking to T7
14:45 Start T7
1600 Finish moving rig to trailer on Cahokia St. Anthony leaves site

7/10/07 T7

0930 WL = 4.54 FT BGS TD = 16 FT, 1 volume = 1 liter

T7 0940 Start Purging WL = 8.35 FT BTOC

TIME	WL	TEMP °C	FLOW RATE mL/min	PH	COND. mS/cm	TURB (NTU)	Vol (L)
0944	8.63	18.41	100mL/min	6.50	675	491	
0950	8.66	17.25	125	6.70	661	328	
0953	8.82	17.02	125	6.73	655	232	
1000	8.90	17.06	125 mL/min	6.68	655	~~258~~ 237	2.5
1005	8.95	16.75	125	6.71	649	124	3.125
1010	9.05	16.92	135	6.68	650	176	3.80
1015	8.93	17.06	115	6.67	653	186	4.375
1020	8.92	17.29		6.69	654	~~200~~ 175	4.95
1025	8.87	17.02	115	6.70	652	140	
1030	8.92	17.18		6.69	653	157	
1035	8.95	17.10	115	6.73	652	152	
1040	8.95	17.31		6.72	655	144	
1045	9.00	17.34	115	6.72	654	132	
1050	~~9.09~~ 9.04	17.22		6.72	655	143	
1055	9.05	17.32	120	6.70	655	105	
1100						88	
1105	9.07	17.35		6.81	658	84	
1110	9.10		125			71	
1115	9.14	17.55		6.74	659	~~69~~ 61	
1120	9.18					58	
1125	9.20	17.37	125	6.75	657	—	
1130						49	
1135						41	
1140	9.25	17.86	135	6.73	667	40	
1145	9.25	17.72		6.70	663	35	
1150						34	
1155	9.28	18.45		6.78	673	31	

Golder Associates

SUBJECT		
Job No. Ref.	Made by Checked Reviewed	Date Sheet 2 of

T7 2/10/07

TIME	WL	TREND	FLOW RATE (mL/min)	pH	Cond (µS/cm)	TURB (NTU)
1200						35
1205	9.30	18.39	138	6.68	671	25
1210						27
1215	9.30	18.19		6.52	669	22
1220	9.30	18.53	150	6.56	673	24
1225	9.34	18.47		6.60	673	20
1230	9.35	17.97	135	6.63	666	18
1240	9.32	18.14		6.58	667	18
1245	9.35	17.64		6.52	660	18
1250						

WL = 9.22 m BTOC

TIME

Golder Associates

SUBJECT

Job No.

Ref.

Made by

Checked

Reviewed

Date

Sheet 3 of

7/11/07

T16

0755 ONSITE w/ PU & TONY (CH2MHILL)

0800 WL = 10.64 FT BTOC · STICKUP = 2.55 FT Apartments. 1 volume = 0.6 Liters

0815 Start pumping

Time	WL (FT BTOC)	TEMP (°C)	pH	COND (µS/cm)	TURB (NTU)	Q (ml/min)
0821		20.80	6.39	346	165	
0826	11.25	20.35	6.47	361	78.2	
0831	11.27	20.40	6.61	358	33.1	120
0835	11.26	20.26	6.63	361	13.7	
0840	11.28	20.15	6.66	364	10.3	110
0845	11.30	20.26	6.57	373	4.27	
0850	11.32	20.25	6.66	410	3.41	115
0855	11.33	20.20	6.73	415	2.34	
0900	11.35	20.20	6.73	409	2.07	
0905		20.15	6.74	405	1.91	
0910	11.36	20.11	6.74	400	1.39	110
0915		20.01	6.72	403	2.20	
0920	11.38	19.90	6.72	407	2.69	110

MW-T16-UNF 0920

MW-T16-UNF-MS 0920

MW-T16-UNF-MSD 0920

MW-T16-10 0925

MW-T16-0.45 0930

Golder Associates

SUBJECT		
Job No. / Ref.	Made by / Checked / Reviewed	Date / Sheet 4 of

7/11/07

52 1017 WL = 10.45 FT BTOC ; STICKUP = 0.45 FT ; WELL VOLUME = 0.52 Liters

1020 Start pumping

TIME	WL (FT BTOC)	TEMP (°C)	pH	COND (mS/cm)	TURB (NTU)	Q (mL/min)
1025	11.49	19.52	6.68	891	261	110
1030	11.50	19.20	6.70	900	167	120
1035	11.52	18.61	6.75	716	61.6	
1040	11.53	18.52	6.76	690	37.0	
1045	11.54	18.30	6.76	663	17.1	120
1050	11.53	18.39	6.76	603	11.4	
1055	11.53	18.39	~~6.76~~	585	6.35	120
1100	11.53	18.45	6.73	598	4.88	
1105		18.52	6.75	650	5.36	+
1110	11.58	18.56	6.75	670	3.39	100
1115	11.52	18.58	6.76	528	3.87	110
1120	11.53	18.58	6.75	536	4.13	
1125	11.52	~~18.~~ 18.79	6.76	537	4.14	110

MW-T2-UNF 1125
MW-T2-10 1130
MW-T2-0.45 1135
DUP-1 recorded w/ MW-T2-UNF

Golder Associates

SUBJECT		
Job No. Ref.	Made by Checked Reviewed	Date Sheet 5 of

7/10/07

T6

1322 WL = 8.49 FT BTOC ; STICKUP = 1.30 FT ; well volume = 0.16 Litres

TD = 12 FT

Time	WL (FT BTOC)	TEMP (°C)	pH	Cond (µs/cm)	Turb (NTU)	Q (mL/min)
1335	9.67	18.45	6.38	880	112	110
1340	9.75	17.39	6.53	861	35.2	
1345	9.77	16.98	6.55	861	22.2	
1350	9.77	17.02	6.55	726	17.4	110
1355	9.77	16.66	6.57	773	13.7	
1400	9.79	16.85	6.55	683	14.5	120
1405	9.79	16.69	6.53	652	10.8	
1410	9.80	16.78	6.53	631	9.79	120
1415	9.80	16.74	6.54	661	8.16	
1420	9.80	16.57	6.56	769	8.78	125
1425	—	16.63	6.57	692	6.76	
1430	9.80	16.69	6.55	~~585~~ 693	5.90	125
1435		16.73	6.57	652	5.60	
1440	9.82	16.64	6.59	761	5.36	125
1445	9.82	16.57	6.59	763	4.25	
1450	9.82	16.49	6.59	757	5.52	130
1455		16.41	6.60	~~737~~ 743	3.76	
1500	~~9.87~~ 9.82 MSL	16.59	6.60	757	4.06	130
1505	9.83	16.49	6.61	750	3.07	

MW-T6-UNF 1510
MW-T6-10 1515
MW-T6-0.45 1520
DUP-2 assoc w/ MW-T6-0.45

APPENDIX B

LABORATORY ANALYTICAL REPORTS

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-28339-1

SDG Number: SDC028

Job Description: Monsanto Dead Creek - Cadmium -July 2007

For:
Golder Associates Inc.
820 South Main Street
Suite 100
St. Charles, MO 63301

Attention: MIke Lemon

Lidya Gulizia
Project Manager I
lidya.gulizia@testamericainc.com
08/09/2007

cc: Mr. Richard Williams

TestAmerica Laboratories, Inc.
TestAmerica Savannah 5102 LaRoche Avenue, Savannah, GA 31404
Tel (912) 354-7858 Fax (912) 352-0165 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

Receipt
All samples were received in good condition within temperature requirements.

Metals
No analytical or quality issues were noted.

Comments
The analysis method on the chain of custody (COC) record was revised to Method 6020 (ICP/MS) from Method 6010 (ICP) following client confirmation.

METHOD SUMMARY

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Inductively Coupled Plasma - Mass Spectrometry	STL SAV	SW846 6020	
Acid Digestion of Waters for Total Recoverable or	STL SAV		SW846 3005A
Sample Filtration performed in the Field	STL SAV		FIELD_FLTRD

LAB REFERENCES:

STL SAV = TestAmerica Savannah

METHOD REFERENCES:

SW846 - "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Method	Analyst	Analyst ID
SW846 6020	Boyuk, Brian	BB

SAMPLE SUMMARY

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-28339-1	MW-T7-UNF	Water	07/10/2007 1250	07/12/2007 0925
680-28339-2	MW-T7-10	Water	07/10/2007 1255	07/12/2007 0925
680-28339-3	MW-T7-0.45	Water	07/10/2007 1300	07/12/2007 0925
680-28339-4	MW-T16-UNF	Water	07/11/2007 0920	07/12/2007 0925
680-28339-4MS	MW-T16-UNF	Water	07/11/2007 0920	07/12/2007 0925
680-28339-4MSD	MW-T16-UNF	Water	07/11/2007 0920	07/12/2007 0925
680-28339-5	MW-T16-10	Water	07/11/2007 0925	07/12/2007 0925
680-28339-6	MW-T16-0.45	Water	07/11/2007 0930	07/12/2007 0925
680-28339-7	MW-T2-UNF	Water	07/11/2007 1125	07/12/2007 0925
680-28339-8	MW-T2-10	Water	07/11/2007 1130	07/12/2007 0925
680-28339-9	MW-T2-0.45	Water	07/11/2007 1135	07/12/2007 0925
680-28339-10FD	DUP-1	Water	07/11/2007 0000	07/12/2007 0925
680-28339-11	MW-T6-UNF	Water	07/11/2007 1510	07/12/2007 0925
680-28339-12	MW-T6-10	Water	07/11/2007 1515	07/12/2007 0925
680-28339-13	MW-T6-0.45	Water	07/11/2007 1520	07/12/2007 0925
680-28339-14FD	DUP-2	Water	07/11/2007 0000	07/12/2007 0925

SAMPLE RESULTS

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T7-UNF**

Lab Sample ID: 680-28339-1
Client Matrix: Water

Date Sampled: 07/10/2007 1250
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Total Recoverable

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0451
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium	0.00024	J	0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T7-10**

Lab Sample ID: 680-28339-2
Client Matrix: Water

Date Sampled: 07/10/2007 1255
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0457
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium, Dissolved	0.00016	J	0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T7-0.45**

Lab Sample ID: 680-28339-3
Client Matrix: Water

Date Sampled: 07/10/2007 1300
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0504
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium, Dissolved	0.00017	J	0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T16-UNF**

Lab Sample ID: 680-28339-4
Client Matrix: Water

Date Sampled: 07/11/2007 0920
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Total Recoverable

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0511
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium	0.00013	J	0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T16-10**

Lab Sample ID: 680-28339-5
Client Matrix: Water

Date Sampled: 07/11/2007 0925
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0559
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium, Dissolved	0.00014	J	0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T16-0.45**

Lab Sample ID: 680-28339-6
Client Matrix: Water

Date Sampled: 07/11/2007 0930
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0607
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium, Dissolved	0.00050	U	0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T2-UNF**

Lab Sample ID: 680-28339-7
Client Matrix: Water

Date Sampled: 07/11/2007 1125
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Total Recoverable

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0613
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium	0.00056		0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T2-10**

Lab Sample ID: 680-28339-8
Client Matrix: Water

Date Sampled: 07/11/2007 1130
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0620
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium, Dissolved	0.00051		0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T2-0.45**

Lab Sample ID: 680-28339-9
Client Matrix: Water

Date Sampled: 07/11/2007 1135
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0627
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium, Dissolved	0.00058		0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **DUP-1**

Lab Sample ID:	680-28339-10FD	Date Sampled:	07/11/2007 0000
Client Matrix:	Water	Date Received:	07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Total Recoverable

Method:	6020	Analysis Batch: 680-80940		Instrument ID:	ICP MS
Preparation:	3005A	Prep Batch: 680-80650		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	07/21/2007 0634			Final Weight/Volume:	250 mL
Date Prepared:	07/19/2007 1611				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium	0.00056		0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T6-UNF**

Lab Sample ID: 680-28339-11
Client Matrix: Water

Date Sampled: 07/11/2007 1510
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Total Recoverable

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0641
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium	0.00015	J	0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T6-10**

Lab Sample ID: 680-28339-12
Client Matrix: Water

Date Sampled: 07/11/2007 1515
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0648
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium, Dissolved	0.00050	U	0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **MW-T6-0.45**

Lab Sample ID: 680-28339-13
Client Matrix: Water

Date Sampled: 07/11/2007 1520
Date Received: 07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Dissolved

Method: 6020
Preparation: 3005A
Dilution: 1.0
Date Analyzed: 07/21/2007 0655
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium, Dissolved	0.00050	U	0.00012	0.00050

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Client Sample ID: **DUP-2**

Lab Sample ID:	680-28339-14FD	Date Sampled:	07/11/2007 0000
Client Matrix:	Water	Date Received:	07/12/2007 0925

6020 Inductively Coupled Plasma - Mass Spectrometry-Dissolved

Method:	6020	Analysis Batch: 680-80940		Instrument ID:	ICP MS
Preparation:	3005A	Prep Batch: 680-80650		Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	07/21/2007 0716			Final Weight/Volume:	250 mL
Date Prepared:	07/19/2007 1611				

Analyte	Result (mg/L)	Qualifier	MDL	RL
Cadmium, Dissolved	0.00013	J	0.00012	0.00050

DATA REPORTING QUALIFIERS

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Lab Section	Qualifier	Description
Metals		
	U	Indicates the analyte was analyzed for but not detected.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

QUALITY CONTROL RESULTS

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 680-80650					
LCS 680-80650/17-A	Lab Control Spike	R	Water	3005A	
MB 680-80650/16-A	Method Blank	R	Water	3005A	
680-28339-1	MW-T7-UNF	R	Water	3005A	
680-28339-2	MW-T7-10	D	Water	3005A	
680-28339-3	MW-T7-0.45	D	Water	3005A	
680-28339-4	MW-T16-UNF	R	Water	3005A	
680-28339-4MS	Matrix Spike	R	Water	3005A	
680-28339-4MS	Matrix Spike	R	Water	3005A	
680-28339-4MSD	Matrix Spike Duplicate	R	Water	3005A	
680-28339-4MSD	Matrix Spike Duplicate	R	Water	3005A	
680-28339-5	MW-T16-10	D	Water	3005A	
680-28339-6	MW-T16-0.45	D	Water	3005A	
680-28339-7	MW-T2-UNF	R	Water	3005A	
680-28339-8	MW-T2-10	D	Water	3005A	
680-28339-9	MW-T2-0.45	D	Water	3005A	
680-28339-10FD	DUP-1	R	Water	3005A	
680-28339-11	MW-T6-UNF	R	Water	3005A	
680-28339-12	MW-T6-10	D	Water	3005A	
680-28339-13	MW-T6-0.45	D	Water	3005A	
680-28339-14FD	DUP-2	D	Water	3005A	
Analysis Batch:680-80940					
LCS 680-80650/17-A	Lab Control Spike	R	Water	6020	680-80650
MB 680-80650/16-A	Method Blank	R	Water	6020	680-80650
680-28339-1	MW-T7-UNF	R	Water	6020	680-80650
680-28339-2	MW-T7-10	D	Water	6020	680-80650
680-28339-3	MW-T7-0.45	D	Water	6020	680-80650
680-28339-4	MW-T16-UNF	R	Water	6020	680-80650
680-28339-4MS	Matrix Spike	R	Water	6020	680-80650
680-28339-4MS	Matrix Spike	R	Water	6020	680-80650
680-28339-4MSD	Matrix Spike Duplicate	R	Water	6020	680-80650
680-28339-4MSD	Matrix Spike Duplicate	R	Water	6020	680-80650
680-28339-5	MW-T16-10	D	Water	6020	680-80650
680-28339-6	MW-T16-0.45	D	Water	6020	680-80650
680-28339-7	MW-T2-UNF	R	Water	6020	680-80650
680-28339-8	MW-T2-10	D	Water	6020	680-80650
680-28339-9	MW-T2-0.45	D	Water	6020	680-80650
680-28339-10FD	DUP-1	R	Water	6020	680-80650
680-28339-11	MW-T6-UNF	R	Water	6020	680-80650
680-28339-12	MW-T6-10	D	Water	6020	680-80650
680-28339-13	MW-T6-0.45	D	Water	6020	680-80650
680-28339-14FD	DUP-2	D	Water	6020	680-80650

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch

Report Basis
D = Dissolved
R = Total Recoverable

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Method Blank - Batch: 680-80650

Method: 6020
Preparation: 3005A
Total Recoverable

Lab Sample ID: MB 680-80650/16-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 07/21/2007 0430
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650
Units: mg/L

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Result	Qual	MDL	RL
Cadmium	0.00050	U	0.00012	0.00050
Cadmium, Dissolved	0.00050	U	0.00012	0.00050

Lab Control Spike - Batch: 680-80650

Method: 6020
Preparation: 3005A
Total Recoverable

Lab Sample ID: LCS 680-80650/17-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 07/21/2007 0437
Date Prepared: 07/19/2007 1611

Analysis Batch: 680-80940
Prep Batch: 680-80650
Units: mg/L

Instrument ID: ICP MS
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 250 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Cadmium	0.0500	0.0473	95	75 - 125	
Cadmium, Dissolved	0.0500	0.0473	95	75 - 125	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-80650

Method: 6020
Preparation: 3005A
Total Recoverable

MS Lab Sample ID:	680-28339-4	Analysis Batch:	680-80940	Instrument ID:	ICP MS
Client Matrix:	Water	Prep Batch:	680-80650	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	07/21/2007 0532			Final Weight/Volume:	250 mL
Date Prepared:	07/19/2007 1611				

MSD Lab Sample ID:	680-28339-4	Analysis Batch:	680-80940	Instrument ID:	ICP MS
Client Matrix:	Water	Prep Batch:	680-80650	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	50 mL
Date Analyzed:	07/21/2007 0553			Final Weight/Volume:	250 mL
Date Prepared:	07/19/2007 1611				

	% Rec.						
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Cadmium	95	95	75 - 125	1	20		
Cadmium, Dissolved	95	95	75 - 125	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Serial Number 100418

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

⊗ **STL Savannah**
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

○ Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
M	043-9670	
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Leah G.		
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
M. Lemon	636-724-9191	
CLIENT NAME	CLIENT E-MAIL	
Cousor	mlemon@gober.com	
CLIENT ADDRESS		
820 S. Main Ste 100, St Charles, MO		
COMPANY CONTRACTING THIS WORK (if applicable)		
Mousand- Richard Williams		

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STANDARD REPORT DELIVERY ⊗
DATE DUE _____
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	MATRIX: AQUEOUS (WATER)	MATRIX: SOLID OR SEMISOLID	MATRIX: AIR	MATRIX: NONAQUEOUS LIQUID (OIL, SOLVENT,...)	NUMBER OF CONTAINERS SUBMITTED: 6010 Cadmium	NUMBER OF CONTAINERS SUBMITTED: HNO3 PRESERVATIVE	REMARKS
7/6/07	1510	MW-T6-UNF		1				1		Level IV QA/QC
7/6/07	1515	MW-T6-10		1				1		Deliverable
7/6/07	1520	MW-T6-0.45		1				1		
—	—	DUP-2		1				1		

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
Michael A. Lemon	7/6/07	1700						
RECEIVED BY: (SIGNATURE) EMPTY CONTAINERS	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
	071207	0925			680-28339	

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STL 8240-680 (12/02)

Serial Number 100419

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
Monsanto Dead Creek	043-8670	IL
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Lidia G.		
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Mike Lemon	636-724-9191	
CLIENT NAME	CLIENT E-MAIL	
Golder	mlemon@golden.com	
CLIENT ADDRESS		
820 S. Main Ste 100, St. Charles, MO		
COMPANY CONTRACTING THIS WORK (if applicable)		
Monsanto - Richards Williams		

PAGE 1 OF 2

STANDARD REPORT DELIVERY ☒
DATE DUE _____
EXPEDITED REPORT DELIVERY (SURCHARGE) ○
DATE DUE _____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	MATRIX TYPE: AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	NUMBER OF CONTAINERS SUBMITTED: 6010 Cadmium	HNO3 PRESERVATIVE	REMARKS
7/10/07	1250	MW-T7-UNF		X				1		LEVEL IV QAQC
7/10/07	1255	MW-T7-10		X				1		
7/10/07	1300	MW-T7-0.45		X				1		
7/11/07	0920	MW-T16-UNF		X				1		
7/11/07	0920	MW-T16-UNF-MS		X				1		
7/11/07	0920	MW-T16-UNF-MSD		X				1		
7/11/07	0925	MW-T16-10		X				1		
7/11/07	0930	MW-T16-0.45		X				1		
7/11/07	1125	MW-T2-UNF		X				1		
7/11/07	1130	MW-T2-10		X				1		
7/11/07	1135	MW-T2-0.45		X				1		
—	—	DUP-1		X				1		

TEMP. 3.8

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
Mike D. Lemon	7/11/07	1700						
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

EMPTY CONTAINERS

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS
	071207	0925	YES ○ NO ○		0680-76339	

STL8240-680 (12/02)

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LOGIN SAMPLE RECEIPT CHECK LIST

Client: Golder Associates Inc.

Job Number: 680-28339-1
Sdg Number: SDC028

Login Number: **28339**

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	NA	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.8 C
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	NA	
Samples do not require splitting or compositing.	NA	

APPENDIX C

DATA VALIDATION REPORTS

QA LEVEL 3 - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: Mark Haddock
Project Name: Monsanto Dead Creek
Project Number: 043-9670
Reviewer: Amanda Gilbertson
Validation Date: 08/13/07

Laboratory: Test America
SDG #: SDC028
Analytical Method (type and no.): Metals 6020
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐
Sample Names MW-T7-UNF, MW-T7-10, MW-T7-0.45, MW-T16-UNF, MW-T16-10, MW-T16-0.45, MW-T2-UNF, MW-T2-10, MW-T2-0.45, DUP-1, MW-T6-UNF, MW-T6-10, MW-T6-0.45, DUP-2

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Aqueous
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☐	☐	☐	
h) Field Calibration within control limits?	☐	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☐	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	☒	☐	☐	
b) Was the COC signed by both field and laboratory personnel?	☒	☐	☐	
c) Were samples received in good condition?	☒	☐	☐	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☒	☐	☐	
b) Were hold times met for sample analysis?	☒	☐	☐	
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☒	☐	☐	
g) Were any matrix problems noted?	☐	☒	☐	

QA LEVEL 3 - INORGANIC DATA EVALUATION CHECKLIST

Calibration Verification (ICV/CCV)	YES	NO	NA	COMMENTS
a) Complete for all target metals and CN?	☐	☐	☐	
b) ICV criteria achieved?	☒	☐	☐	
c) CCV criteria achieved?	☒	☐	☐	
d) CCV analyzed every 2 hours or 10 samples?	☒	☐	☐	
e) CRDL standard analyzed for ICP and AA?	☒	☐	☐	(not necessarily required for SW846)
f) If analyzed, run at appropriate frequency?	☒	☐	☐	
g) If analyzed, within control limits?	☒	☐	☐	%R = 98%

Blanks	YES	NO	NA	COMMENTS
a) Were blanks performed at required frequency?	☒	☐	☐	
b) Were analytes detected in the prep blank(s)?	☐	☒	☐	
c) ICB/CCB for all target metals and CN?	☒	☐	☐	
d) ICB criteria achieved?	☒	☐	☐	
e) CCB criteria achieved?	☒	☐	☐	
f) CCB analyzed every 2 hours or 10 samples?	☒	☐	☐	
g) Were analytes detected in the field/equip blank(s)?	☐	☐	☒	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met (note %R)?	☐	☐	☒	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met (note %R)?	☐	☐	☒	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met (note RPD)?	☐	☐	☒	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
d) Was a LCS analyzed once per SDG?	☒	☐	☐	
e) Were the proper analytes included in the LCS?	☒	☐	☐	
f) Was the LCS accuracy criteria met?	☒	☐	☐	

Duplicates (Lab and Field)	YES	NO	NA	COMMENTS
g) Were field duplicates collected (note original and duplicate sample names)?	☒	☐	☐	MW-T2-UNF / DUP-1 ; MW-T6-0.45 / DUP-2
h) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	RPD < 20%
i) Were lab duplicates analyzed (note original and duplicate samples)?	☒	☐	☐	MW-T16-UNFSD
j) Were lab dup. precision criteria met (note RPD)?	☒	☐	☐	RPD < 20%

QA LEVEL 3 - INORGANIC DATA EVALUATION CHECKLIST

ICP Serial Dilution	YES	NO	NA	COMMENTS
a) Was a ICP SD analyzed once per SDG?	☒	☐	☐	
b) Was the ICP SD criteria met?	☐	☒	☐	%D > 10%

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	☐	☐	☒	
b) Was the %D within control limits?	☐	☐	☒	

Split Sample Results	YES	NO	NA	COMMENTS
a) Were split samples collected (indicate IDs)?	☐	☐	☒	
b) Were the split sample results within criteria?	☐	☐	☒	

Comments/Notes: all ≥MDL qualified w/ UJ; non-detected qualified w/ UJ because ICP SD %D >10%.

QA LEVEL 3 - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
MW-T16-045	Cadmium		UJ	ICP SD %>10%
MW-T2-UNF			J	
MW-T2-10			J	
MW-T2-045			J	
DUP-1			J	
MW-T6-10			UJ	
MW-T6-0.45			UJ	

Signature: _____ Date: 8/17/07